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*A. punctipennis*. This term should have been *A. pseudopunctipennis*, which in fact is a species quite distinct from the *punctipennis* with which Dr. Dupree worked. W. V. KING

#### SCIENTIFIC BOOKS

*Scientific and Applied Pharmacognosy intended for the Use of Students in Pharmacy, as a Handbook for Pharmacists and as a Reference Book for Food and Drug Analysts and Pharmacologists.* By HENRY KRAEMER, professor of botany and pharmacognosy in the Philadelphia College of Pharmacy. One vol., pp. viii, 857, with over 300 plates comprising about 1,000 figures. Published by the author, 145 North 10th St., Philadelphia.

The writer well remembers the "Manual of Materia Medica" which was used at the Philadelphia College of Pharmacy as text in the middle of the eighties. Its author had gone beyond the mere description of the gross characteristics of the crude drugs and, following German example, had added *Lupenbilder* to his text. For the rest, it was a compilation of names and synonyms of plants; of constituents and properties, with a purely technical description of the part used as drug. It contained the bare facts which the student was expected to commit to memory. For review purposes, the student fell back on a booklet composed of synoptical tables. In justice to Professor Maisch it should be said that his personality and even his lectures were much more interesting than his text. Indeed, to the student who attended college with a real desire to improve himself, Professor Maisch was one of the principal incentives to aspire to higher ideals.

With even more vividness, the writer remembers a meeting of the Scientific Section of the American Pharmaceutical Association at which the author of the treatise under review read a paper on the teaching of pharmacognosy. Always sincere in what he presents and full of enthusiasm of his mission, the speaker carried away his audience, which apparently felt that a new day had dawned in pharmaceutical pedagogy.

If Bastin had already gone a step farther

than Maisch, his successor seemed to feel that pharmacognosy was to be made an exact science by the histological study of drugs. His ambition was to drill his students so that, even in their dreams, they might recognize the fragments of tissues found in a mixed powder of several drugs and thereby identify the components. This was a highly ambitious program, the attainment of which might be realized by a few experts who had spent their lives in work of this kind, but was scarcely to be hoped for on part of the undergraduates. Moreover, such a course, even without the possible hope of attainment, is just as highly technical as the text of Maisch's "Manual." Neither should be the goal of the teacher of pharmacognosy. Fortunately for the teaching of pharmacognosy in the United States, Professor Kraemer, not many years later, repudiated his own position and came out boldly for the mastering of a few fundamental principles as opposed to the grind of a lot of technical detail.

The statutory definition of pharmacy and pharmacology by the department of education of the state of New York is exceedingly unfortunate and reveals, as well as any single incident may, the arbitrariness of educational standardization. It was not to be expected that a representative of the P. C. P. would be unduly influenced by legislation at Albany, yet we are grateful for the use of the word pharmacognosy rather than pharmacology as the characteristic word in the title. Both words mean etymologically the same, both stand for what may be regarded the same science, yet, whereas pharmacology represents the medical viewpoint, pharmacognosy represents that of the pharmacist. Both pharmacologist and pharmacognocist deal practically with the same subject-matter, but the point of emphasis of each naturally differs according to his professional viewpoint. The student of pharmacology wants to know about the vegetable origin of his drugs, he must know something about their chemical constituents, but the point of emphasis is that of physiological action. Wherever possible, it is the animal experiment that engages his attention as pro-

spective physician. As prospective pharmacist, the student of pharmacognosy wants to know that cinchona is a febrifuge, but he should know primarily what alkaloids are contained in cinchona bark and should have experience in the chemical assay for total alkaloids as well as for quinine. He should be posted on the botanical characteristics, both macroscopic and microscopic, of the drug and learn how to make the medicinal preparations and the reasons for a given method of preparation. Thus the students of medicine and pharmacy, in studying the same subject-matter, should have their subject presented from supplementary, not identical, viewpoints, so that later, as medical and pharmaceutical practitioners, their combined knowledge and experience may prove to the greater advantage of suffering mankind.

Both classes of students, however, should get something more than mere technical information out of these two courses. The mental discipline that should come from all scientific study should not be denied them. Moreover, the humanizing aspect should receive due attention. This is particularly true of the study of pharmacognosy. Possibly no science touches mankind at more points than does pharmacognosy. From the crude drug bale, with its interesting commercial history and even romance, to the working out of the structure of its physiologically active organic constituent and its administration, so many phases of human activity are involved that pharmacognosy may be regarded as one of the best examples of what may possibly be designated the modern scientific humanities.

In his Phi Beta Kappa address at Johns Hopkins the editor of SCIENCE made the following statement:

That education is liberal which enlarges the sympathies and emphasizes our common interests, not that which forms an exclusive clique. On the whole the sciences in their application to human life seem more likely to form an adequate basis for a common culture than the dead languages.

This is certainly true of pharmacognosy. Teachers of history have gone beyond the mere history of wars and warring dynasties, they have even gone beyond the history of institu-

tions and are touching upon certain phases of art as expressions of the evolution of man, but possibly not one has realized that the revolution in chemistry, brought about by Lavoisier, was possibly as important to mankind as the French political revolution, as a victim of which the great scientist was guillotined. Flueckiger was possibly the first to emphasize the humanizing aspects of pharmacognosy. In his "Handbuch der Pharmacognosie," Tschirch carried out the ideas of his master in word and picture, as might be expected of an artist of the camera as well as of the pen.

Compared with the masterpiece of the enthusiast in Bern, Henry Kraemer's "Scientific and Applied Pharmacognosy" falls short to such an extent that the two are not to be regarded in the same class either as to scope or as to execution. One grave mistake, however, which Tschirch made, Kraemer has avoided. Though Tschirch had been teaching pharmacognosy for a life time from the point of view of the botanist, when it came to the publication of his manuscript he adopted a chemical basis of classification of the material. Thus the attempt to place his work on what he apparently regarded a more scientific basis resulted in pseudo-science. Kraemer more fortunately arranges his material according to families.

A detailed criticism of a work like this does not seem called for in a journal like SCIENCE. Errors of statement can, no doubt, be found by any specialist who looks for them in his particular field. If the reader of this review will take the trouble to compare the text- and handbook under consideration with Tschirch's "Handbuch," still in the process of appearing in *Lieferungen*, he need not be told why the German masterpiece would not do as a textbook; nor need the inferiority in text, illustration and general make-up of the new American text be pointed out. One point, however, is noteworthy as a curious omission. Among the works consulted, the author in his preface does not even mention Tschirch, or his predecessors Flueckiger and Hanbury. While, so far as illustrations are concerned, the author has apparently endeavored to impart to his treatise

what may be regarded as a laudable American aspect, it can scarcely be thought possible that he has not consulted, and consulted freely, every fascicle of Tschirch's "Handbuch" as it has been issued from the press. Though the present unfortunate war is teaching us how derelict we have been in making ourselves independent of Europe, so far as vegetable drugs are concerned, yet the pharmacognocist, above all, should ever be mindful of the inscription on the Flueckiger medal: *Scientia non unius populi sed orbis terrarum*. E. K.

*Practical Oil Geology*. By DORSEY HAGER. McGraw-Hill, New York, 1915. Pp. xii + 141; figs. 76, three being full page, and one plate. \$2.00 net.

This handy pocket book puts the stock-in-trade of the petroleum geologist and engineer before the petroleum investor in a way that invites friendship. Further, it lays sound ideas of applied structural and stratigraphical geology before a class which is glad to substitute such revelations for the "luck" of the oil (or water) wizard.

While the space is so small as to call for brevity at the expense at times of clearness, the numerous excellent cuts—most of them evidently the author's—more than balance in field ingenuity and the applications of pure geology what may be wanting in the way of academic clarity of statement.

Only two or three proof errors appear in the text proper. An early second edition for so good a book on a timely subject seems sure, and in the reappearance no doubt there will be weeded out such oversights as: "Igneous rocks, or volcanics," p. 28; "a level line in the plane of the horizontal," p. 71; "curved axis," fig. 50 and p. 86; Comanchean equivalent to the whole Mesozoic, p. 38. Certainly the errors in Table XI. will not be recopied, nor perhaps that in averaging the viscosity of Oklahoma oils, especially the unfair inclusion of the high viscosity from Wheeler, Table VI. Convenience would be served by referring to a figure on a definite page rather than, say, "(See Fig. 19, Chapter III.)."

Useful adaptations for the layman are: Geo-

logical Names (Kemp); Mathematical Tables (Hayes); Tests for Oil (Woodruff); Favorable and Unfavorable Indications for Oil (Craig); Definitions of Formation and Member (Snyder). Other tables and data will serve more technical needs, and the cuts will doubtless be freely drawn upon by other authors.

The neat and convenient get-up, and strong, leather binding are characteristic of these publishers.

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#### SPECIAL ARTICLES

##### ON THE RELATIVE NUMBERS OF RHIZOPODS AND FLAGELLATES IN THE FAUNA OF SOILS

THE investigations upon the protozoan fauna of the soil and its interrelations with the bacterial flora therein contained has opened a new field of exploration and suggested a new line of attack for the problem of "sick soils." The work of Russell and Hutchinson and their school indicates that the constituents of the protozoan fauna, notably the amoebas, affect appreciably the bacterial content of the soils they inhabit, and thus impinge upon some of the problems of fertility. This line of evidence has stimulated many preliminary investigations into the extent, distribution and qualitative make-up of the protozoan fauna of the soil. In many cases these attempts at the qualitative determination of these organisms have gone no farther than to record the relative numbers of the individuals belonging to the groups of rhizopods, flagellates and ciliates, with occasional questionable identifications of a few genera or more rarely still of species. The purely preliminary status of such investigations is readily inferred by those familiar with the fields of bacteriology, immunity and protozoology. Valid conclusions here can rest only upon a knowledge of the fauna which extends to an accurate determination of the species concerned and of their feeding habits or symbiotic relationships to the bacterial flora, which may be even more subtle than the gross phase of food relations.

One naturally recalls in this connection the